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ABSTRACT

Los Alamos National Laboratory's Research Library has developed a World Wide Web (WWW) page to allow laboratory staff, as well as individuals from around the world, access to information via the Internet. While many Web pages offer information solely on the organization, the Los Alamos National Laboratory page provides links to reference materials in different scientific and technical subject areas, electronic publications, and directories, as well as pointers to lists elsewhere on the Web that cover each subject. This paper describes the home page setup and presents an overview of searching options on the Web. Subject- specific organized lists of hyperlinks (Yahoo, WWW Virtual Library, Planet Earth) and search engines (Webcrawler, Lycos, Yahoo) are compared and evaluated. (SWC)

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THE INTERNET AS A REFERENCE TOOL:

Accessing Scientific and Technical Information via the World Wide Web

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Los Alamos National Laboratory is located in northern New Mexico. The laboratory is a scientific research facility operated by the University of California for the Department of Energy. The Research Library, with its book and journal collections and, increasingly, its electronic access, supports the efforts of the laboratory research staff. The Research Library has developed a World Wide Web home page to allow laboratory staff access to information via the Internet. This page, while designed for laboratory staff, is not limited to them. Access is allowed to individuals from around the globe. Roughly one-half of the accesses to our Web structure come from outside the laboratory.

Many sites that have pages focus solely on information about their organization. At universities this is primarily information about the courses that they offer, homework assignments, and the faculty and their areas of research. Many libraries that provide links to subject information also primarily point to this type of information as well, except for in the general reference area where they primarily point to reference materials such as dictionaries, the periodic table, etc. At the Los Alamos National Laboratory Research Library we made the decision that these were not the types of links that we wanted on our subject pages. We make an effort to search the Web to find potential links that contain the same type of information that might be found in a library. We have access to reference type materials in the different subjects, electronic publications, directories, etc., as well as pointers to lists elsewhere on the Web that cover that subject. As we serve primarily the scientific community, most of the links we have made have been to scientific and technical resources. As we are a government institution we have also made links to governmental information. Other types of information include business and general reference.

The Research Library (http://lib-www.lanl.gov/) page has access to these types of resources by selecting the link 'Subject Resources'. The subjects that are listed on that page include general reference, astronomy, biology-genetics, business, chemistry, computer science, engineering, environmental, government resources, international affairs, Internet, legal resources, Los Alamos history, mathematics, nuclear information, physics, standards and regulations, electronic texts, and journal tables of contents. Selecting the topic of interest brings up a page with links to resources in the field.

As stated earlier, we try to make direct links to the relevant information. Following are a few samples of the information available from some of our different subject pages. On the astronomy page are links to the Nine Planets; a multimedia guide to the solar system, and Views of the Solar System which contains images and information about the sun, planets, comets, etc. in our solar system. The biology/genetics page has links to Morbidity & Mortality Weekly Report and to the Hazardous Substance Release/Health Effects Database. The chemistry page contains MSDSs for chemicals and the periodic table. The engineering page has links to the Thomas Register and to many companies' semiconductor data sheets. The mathematics page has links to mathematical constants and to several electronic journals. The physics page has pointers to physics Nobel Prize winners, conversion of units, and the table of the nuclides. Check out the pages to see all of the other information that we have made available through our server.

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The Research Library is in the process of having all the Los Alamos reports starting with LA-1 scanned so that they will be available electronically. This is being done so that the laboratory staff and general public will have improved access to results of research done at Los Alamos National Laboratory. The URL for the reports is listed at the top of the detailed display of the record in our online catalog (telnet library.lanl.gov). New reports are received in an electronic form and are being made available through the Web in pdf (portable document format) through Adobe Acrobat. (The Acrobat Reader is available free on the Web from Adobe at http://www.adobe.com/./.)

The reports are of many different types. There is everything from the Institutional Plan and the annual Research Highlights to the more technical reports. The reports are accessed from the Los Alamos Publications page (http://lib-www.lanl.gov/la-pubs/la-pubs.htm) from the Research Library home page. The technical reports are listed under Los Alamos Reports but some are also listed under broad subject categories such as computing, environmental technologies, materials science, and physics. They are arranged by report number. The reports cover the entire spectrum of laboratory research. Some representative titles include Atlas of the Breeding Birds of Los Alamos County, Environmental Surveillance at Los Alamos During 1992, New Mexico, HIV/AIDS in the Workplace: A Positive Approach, International Technical Cooperation Program at Los Alamos National Laboratory, and Life Sciences Division and Center for Human Genome Studies 1992-1993. Some other titles include Measuring Human Brain Activity, Physics Division Technology Review, The National High Magnetic Field Laboratory, Nuclear Borehole Logging Applied to Environmental Restoration, and Shaping the Library of the Future: Digital Library Developments at Los Alamos National Laboratory's Research Library. We are presently working on making the bibliographic information keyword searchable.

There are many different ways to find information on the World Wide Web if the information is not found at familiar sites. There are many useful lists of sites as well as a number of search engines. Lists of pages have generally been compiled by one or more individuals and are physically located on one or more specific machines while search engine results do not exist until the search is requested. Lists are usually arranged by subject and then broken down into smaller subsets - either narrower subjects, by type of information, by source of information, or some combination of the above. Their hierarchical arrangement makes them ideal for browsing by subject to see what is available electronically.

Yahoo (http://www.yahoo.com/yahoo/) is a list that was started at Stanford University. This list is organized by broad subject (e.g., science, reference) and then by narrower subjects (e.g., agriculture, computer science, ecology, physics). Each narrower subject is further subdivided. Some examples of subdivisions in physics are atomic physics, conferences, institutes, journals, scientific constants, and Usenet. Each of these will take you to a further list with links to actual pages. Items are not limited to being located within one page of the structure. They may be found through several different routes. Using this hierarchical structure is one way to browse Yahoo. Another way is to make use of the search capability. After entering the search term(s) a list is retrieved which shows where in the Yahoo structure the match was found as well as a link to the actual match.

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Search terms can be entered from the main page or the searcher can opt to change the options for more sophisticated searching.

Other lists include the WWW Virtual Library and Planet Earth.

The WWW Virtual Library (http://www.w3.org/hypertext/DataSources/bySubject/Overview.html) consists of subject oriented lists maintained at sites around the world. There is no consistency in the organization of each page from one sublist to another. The main list starts with broad subject categories which may or may not be further subdivided before directing the user to the information collected at another site. This list does not have a search option like Yahoo to search for specific information contained in the list.

Planet Earth (http://www.nosc.mil/planet_earth/info.html) contains two 'Science Rooms'. Room 1 contains sciences such as physics, mathematics, chemistry, and engineering while Room 2 contains anthropology, medicine, botany, and geology, for example. Subject pages generally consist of 'servers' and 'topics', however some subjects contain more categories as more information has been compiled in those areas. Physics is one area that contains extensive information. It is divided into the following eight categories:

- Specialized Fields in Physics
- Generalized Servers
- Specialized Servers
- Research Laboratories
- Physics Institutes
- Miscellaneous Physics Information
- Laws, Constants, Periodic Tables, Weights, Measures
- Physicists and Nobel Prizes

Planet Earth also has a way to search for information across the pages. It is not as sophisticated as that offered by Yahoo in that there are no options that the searcher can set. It also only indicates the page within the structure where the information can be found. One must then go to that page and search the page to find the search term.

Many other lists can be found on the WWW. The above are some examples of those with a strong science/technology focus. The best way to use these lists is to find one or two that work well for you and create bookmarks for those sites. Although links to most of the lists mentioned above can be found on the Los Alamos National Laboratory Research Library pages they are often to areas which reflect the scientific and technical interests of the laboratory staff so those whose interests are broader might do better to access them directly.

These lists, while being useful for browsing to see what is available in a particular field, are not comprehensive. They have been compiled by individuals from information that they have found or has been sent to them as a suggested addition to their page. If the needed information is not identified from one or more of these lists that does not necessarily mean that the information is unavailable via the World Wide Web. If unsuccessful with this avenue, try using instead one of the many search engines offered around the World Wide Web.

Search engines are different from the lists in that they go out and search around the Web rather than search locally mounted information. These are generally

keyword searchable but do not all function in the same manner. Some search just the titles of pages while others search the complete text of a page. Also, multiple keyword searches function differently across search engines. Some will 'and' terms together while in other systems the default option is to 'or' the terms. Different search engines search different pages as well. Some are subject oriented. These search engines are very popular and will often be busy. If one is busy, either try another search engine or wait a few minutes and try it again. All search engines work differently. Because of this, the best thing to do when using one for the first few times is to read the instructions before beginning a search. Otherwise, search results could be very different from what is expected.

Webcrawler (http://webcrawler.com/) was originally developed at the University of Washington and is now part of America Online, is one search engine. The terms are entered on a single line and the user is given the option to either 'and' or 'or' the terms together. The number of results to be retrieved can also be selected. If a plural is entered, Webcrawler searches the singular form of the word as well. It searches both the page title and the page content. The results are retrieved in a ranked order with the most relevant ones first. Page titles are listed with active links so the searcher can proceed directly to a page of interest. If fewer results are displayed than exist, the option is given to view the next set of results. The main search option is for browsers that support forms but Webcrawler also supports formless searching.

Lycos (http://lycos.cs.cmu.edu/), from Carnegie Mellon University, is another search engine. It searches the Web daily for sites and reindexes its database weekly. The service offers an interface for those with browsers that support forms as well as those that do not. The forms interface gives the searcher the chance to change the search parameters. The simple search mechanism provides the user with the link and a brief description of the contents of the page. Results are retrieved in ranked order. Ten hits can be retrieved at a time. With the forms option, the user can select the number of hits to view at a time (up to thirty) and the format in which to view the results, either with or without the page descriptions. In either option, the user can request to view the next set of results.

Yahoo maintains a list of search engines. The list is titled 'Searching the Web', which can be accessed through the 'Reference' heading or through the 'Computers and Internet' and then 'World Wide Web' or directly with its URL (http://www.yahoo.com/Computers_and_Internet/Internet/World_Wide_Web/Searching_the_Web/). There are over one hundred options listed offering a wide variety of services and functionality. There are subject specific choices, across the Web options, and other services such as yellow pages.

The Los Alamos National Laboratory Research Library has endeavored to make the World Wide Web a vital tool for serious scientific researchers. By searching out and linking to the growing amount of scientific information available via the Web we are bringing many of the reference materials our researchers need directly to their desktops. We welcome scientific researchers whose fields overlap those at the laboratory to make use of the information we have provided and invite other research librarians to study our pages when designing or updating their own. Suggestions for improvements or useful links can be addressed to lib-info@lanl.gov.